

XVII.—On the African Shrews belonging to the Genus *Crocidura*.—VII. By GUY DOLLMAN.

[Concluded from vol. xvi. p. 514.]

Group 19 (*bicolor*).

Size very small. Colour above greyish, greyish brown, or cinnamon; below silvery grey or whitish. Skulls rather flattened. Fur very short. Second and third upper unicuspid about equal in size.

(104) *Crocidura bicolor*, Boc.

Crocidura bicolor, Bocage, Journ. Sc. Lisb. p. 29 (1889).

A small, short-haired, greyish-brown species, with silvery-grey underparts and a rather flat skull.

General dimensions a trifle less than in *allex*. Fur, as in all the members of this group, very short; hairs of back only about 2–3 mm. in length.

Colour above greyish brown (between “hair-brown” and “fuscous” speckled with pale greyish buff), greyer than in *allex* or *alpina*. Flanks a trifle paler, the colour passing fairly abruptly into the silvery greyish white of the ventral surface, the underparts being lighter than in any of the preceding small species. Backs of hands and feet white. Tail finely haired, distinctly bicoloured, dark brown above, white below; bristle-hairs numerous, greyish in colour.

Skull small, equal in size to that of *b. cunninghamei*; brain-case flatter than in *alpina*. Teeth small, especially the second and third upper unicuspid, which are about equal in size, the third slightly overlapping the second.

Dimensions of the type (as given by Bocage):—

Head and body 53 mm.; tail 42; hind foot 10 (s. u.).

In the Museum Collection there is a series of specimens of *bicolor* from Caconda; the following are the flesh-dimensions of two of these individuals:—

	Head and body.	Tail.	Hind foot.	Ear.
	mm.	mm.	mm.	mm.
♂. Caconda ..	55	38	10	7
♀. „ ..	60	42	10	7

Skull-dimensions of two Caconda specimens:—

Condyllo-incisive length 17·5, 17·2; greatest breadth 7·8, 7·8; least interorbital breadth 3·7, 3·6; length of palate 6·9, 6·7;

postpalatal length 8·2, 7·8 ; greatest maxillary breadth 5·4, 5·3 ; median depth of brain-case 4·2, 3·7 ; length of upper tooth-row 7·3, 7·3.

Hab. Gambos, Mossamedes, Angola.

Type in the Lisbon Museum.

The short fur, greyer colour, lighter underparts, and flatter skull distinguish this Angolan shrew from the East-African *allex* and *alpina*.

(105) *Crocidura bicolor woosnami*, subsp. n.

A cinnamon-coloured race of *bicolor*.

General proportions as in the Angolan form. Fur equally short.

Colour of dorsal surface cinnamon-brown speckled with grey ; flanks cinnamon-brown, the transition to the light colour of the ventral surface quite sharp. Underparts slate-grey washed with white. Backs of hands and feet white. Tail dull brown above, white below ; bristle-hairs white and rather inconspicuous.

Skull of the same semi-flattened type as that of *bicolor*, but rather smaller. Teeth all a little smaller, but similar in shape ; second and third upper unicuspid about equal in size, cingula small.

Dimensions of the type (preserved in spirit) :—

Head and body 53 mm. ; tail 40 ; hind foot 10 ; ear 6·5.

Skull: condylo-incisive length 17 ; greatest breadth 7·8 ; least interorbital breadth 3·4 ; length of palate 7 ; post-palatal length 7·8 ; greatest maxillary breadth 5·3 ; median depth of brain-case 3·8 ; length of upper tooth-row 7·3.

Hab. Lake Ngami.

Type. Adult female. B.M. no. 10. 6. 3. 80. Collected by R. B. Woosnam, Esq.

The rather lighter underparts, more sharply marked off from the cinnamon-brown flanks, and smaller skull distinguish this Ngami race from true *bicolor*.

(106) *Crocidura bicolor hendersoni*, subsp. n.

Closely allied to *bicolor*, but rather larger in size and much richer in colour.

Hind foot a little larger, measuring 11 mm. in length. Fur equally short. Colour of upper parts brownish buff ("sepia" mixed with "fuscous," sprinkled with "neutral

grey"), very different from the slaty colour of the Angolan species. Patches of the old worn coat, which are still retained in this Nyasa specimen, are very much more orange in colour, about as in "tawny olive." Underparts greyish white, as in *bicolor*, not as white as in *woosnami*. Backs of hands and feet rather darker, especially on their outer sides. Tail about equal in length and similar in colouring.

Skull badly broken, only the muzzle remaining intact. Upper unicuspid rather larger than in *bicolor*, the third rather longer than the second.

Dimensions of the type (taken from dry skin) :—

Head and body (stretched) 67 mm.; tail 43; hind foot 11.

Skull: length from front of upper incisors to back of large premolar 5 mm.

Hab. Nyasaland. Altitude 4040 feet.

Type. Adult. B.M. no. O. 7. 31. 1. Original number 4. Collected on May 18th, 1900, by J. Henderson, Esq., and presented by him to the National Collection.

(107) *Crocidura bicolor cunninghamei*, Thos.

Crocidura cunninghamei, Thomas, Ann. & Mag. Nat. Hist. (7) vol. xiv. p. 240 (1904).

A slate-brown coloured race of *bicolor*, with duller underparts and a rather flatter skull.

Size as in *bicolor*. Fur quite short, hairs on back 2-3 mm. in length.

Colour dark slaty grey washed over with brown, the general effect as in "sepia" speckled with "neutral grey," considerably less brown than in *allex* or *alpina*. Belly dull grey, not sharply marked off from the browner upper parts. Backs of hands and feet whitish. Tail finely haired, brown above, dull white below; bristle-hairs numerous, but very inconspicuous.

Skull small, brain-case rather flatter than *bicolor* and considerably more so than in *allex* or *alpina*, and more parallel-sided. Teeth much as in *bicolor*, the third upper unicuspid overlapping the second to a rather greater extent.

Dimensions of the type and two other specimens :—

	Head and body.	Tail.	Hind foot.	Ear.
	mm.	mm.	mm.	mm.
♀ (type)	60	40	11	7
♂. Kama I.	55	38	10	5
♂. Kampala	56	43	10.5	7.5

Skull of type: condylo-incisive length 17·6 mm.; greatest breadth 7·8; least interorbital breadth 3·9; length of palate 7·4; postpalatal length 7·9; greatest maxillary breadth 5·4; median depth of brain-case 4; length of upper tooth-row 7·7.

Hab. "Small uninhabited island one mile north of Sajitu Island, Victoria Nyanza."

Type. Adult female. B.M. no. 2. 7. 5. 6.

In addition to the type there are two further specimens of *cuninghamei* in the collection, one from Kama Island, Victoria Nyanza, and the other from Kampala.

(108) *Crocidura bicolor elgonius*, Osg.

Crocidura bicolor elgonius, Osgood, Ann. & Mag. Nat. Hist. (8) vol. v. p. 369 (1910).

Rather smaller than *cuninghamei*, greyer in colour and with smaller skull.

Size rather less than in either *bicolor* or *cuninghamei*, hind foot only 9 mm. in length. Fur as short as in the allied forms. Colour of dorsal surface much greyer, general effect between "fuscous" and "*Chaetura* drab," considerably less brown than *cuninghamei*. Colour on sides gradually paling and passing imperceptibly into the lighter grey of the belly. Lateral gland very small, marked by short white hairs. Backs of hands and feet darker, dirty brownish grey. Tail finely haired, dark sooty brown above, slightly paler below; bristle-hairs more conspicuous, grey throughout, not darker at their bases as in the Victoria Nyanza form.

Skull smaller, equally flat, brain-case rather narrower. Teeth as in *cuninghamei*, second and third upper unicusps slightly smaller.

Dimensions of type and topotype (♂) (measured in the flesh):—

Head and body 52, 55 mm.; tail 38, 44; hind foot 9, 9; ear 8, 6.

Skull of type: condylo-incisive length 16·7; greatest breadth 7·3; least interorbital breadth 3·2; length of palate 6·8; postpalatal length 8; greatest maxillary breadth 4·8; depth of brain-case 4; length of upper tooth-row 7·2.

Hab. Kirui, Mt. Elgon. Altitude 6000 feet.

Type. Adult female. B.M. no. 10. 4. 1. 47.

The much more sooty coloration and smaller skull distinguish this Elgon race from the Lake form.

Group 20 (*cinderella*).

Size fairly small. Colour above cinnamon, below whitish. Skulls rather flat. Second and third upper unicuspid about equal in size.

(109) *Crocidura cinderella*, Thos.

Crocidura cinderella, Thomas, Ann. & Mag. Nat. Hist. (8) vol. viii. p. 119 (1911).

Size of body about as in *floweri* described below, but tail shorter and hind foot smaller. Fur rather short, but not as short as in the *bicolor* group, hairs of back 3-4 mm. in length.

Colour above pale cinnamon-grey, near "wood-brown" mixed with "drab" and speckled with "neutral grey," the cinnamon tint passing rather abruptly into the light greyish white of the ventral surface; hairs of belly slate-grey, with whitish tips. Backs of hands and feet white. Tail of medium length, rather thick at base, thinly clad with short hairs, drab-grey above, paler below; bristle-hairs numerous, evenly distributed throughout nearly the whole length of the tail.

Skull rather larger than in *floweri* and more heavily built, brain-case narrow and fairly flat. Teeth about as in the Egyptian species, the two small upper unicuspid equal in size.

Dimensions of the type (measured in the flesh):—

Head and body 62 mm.; tail 48; hind foot 11.

Skull: condylo-incisive length 19·7; greatest breadth 8·2; least interorbital breadth 3·8; length of palate 8; postpalatal length 8·8; greatest maxillary breadth 5·9; median depth of brain-case 4·3; length of upper tooth-row 8·3.

Hab. Gemenjulla, French Gambia.

Type. Adult female. B.M. no. 11. 6. 10. 13.

The shorter and less hairy tail and smaller feet distinguish this species from the Egyptian *floweri*, to which it would appear to be most nearly allied.

(110) *Crocidura floweri*, sp. n.

Larger than in the *bicolor* or *nana* groups, tail considerably longer, skull as flat as in *bicolor*.

Size greater than in *bicolor* or *nana*, the hind foot measuring from 12-13 mm. in length. Fur long, hairs of back

from 4-5 mm. in length, considerably longer than in *bicolor*.

Colour (from spirit-specimens) of dorsal surface light cinnamon-brown, changing abruptly on the flanks into the white of the ventral surface; hairs of belly with pale slate-grey bases and whitish tips. Backs of hands and feet dirty white. Tail very long, thinly clad with short hairs, cinnamon-colour above, white below, distinctly bicoloured; bristle-hairs not numerous, entirely confined to the basal half, greyish white in colour, and rather inconspicuous.

Skull much larger than in the other small Egyptian species, *religiosa*, but somewhat of the same flattened type, not so markedly however, the roof of the brain-case slightly convex, about as in *bicolor*. In size the skull is larger than in any of the members of the *bicolor* or *nana* groups, nearly equalling in length that of *cinderella* from the French Gambia. Teeth much larger than in *religiosa*, more as in the Gambia species; second and third upper unicuspid almost equal in size, third slightly overlapping second.

Dimensions of the type (in spirit):—

Head and body 57 mm.; tail 58; hind foot 13; ear 8.

Skulls of type and three topotypes:—

	♂ (type). mm.	♂. mm.	♂. mm.	♀. mm.
Condyllo-incisive length	19·2	18·5	18	18
Greatest breadth	8·4	8	7·8	7·8
Least interorbital breadth	4	3·8	3·7	3·8
Length of palate	7·5	7·4	7·3	7·3
Postpalatal length	8·9	8·4	8·3	8·3
Greatest maxillary breadth	5·6	5·3	5·2	5·4
Median depth of brain-case	4·3	4·2	4·2	4·1
Length of upper tooth-row	8·1	8	7·8	7·6

Hab. Giza, Egypt.

Type. Adult male. B.M. no. 10. 6. 18. 3. Collected by Captain S. S. Flower, and presented to the National Collection by the Egyptian Government Zoological Service.

This species would appear to be most nearly allied to *cinderella*, from which it is distinguished by its longer and more bicoloured tail, larger hind feet, and rather shorter skull with larger brain-case; further, in *cinderella* the bristle-hairs are distributed over nearly the entire length of the tail, while in *floweri* they are strictly confined to the basal half. All the members of the *bicolor* and *nana* groups are considerably smaller in size and have shorter fur.

Group 21 (*nana*).

Size small or very small. Colour above greyish or cinnamon, below greyish or white. Fur very short. Skulls exceptionally flat. Second and third upper unicuspid about equal in size.

(111) *Crocidura nana*, Dobs.

Crocidura nana, Dobson, Ann. & Mag. Nat. Hist. (6) vol. v. p. 225 (1890).

A very small slaty-brown coloured species, with a very flat skull.

Size considerably less than in the *bicolor* group. Fur fairly short, hairs of back measuring 3-4 mm. in length.

Colour of dorsal surface slaty brown ("neutral grey" washed with "Prout's brown"), flanks equally dark, the brownish-grey tint passing fairly abruptly into the greyish white of the ventral surface; belly rather whiter than in the following race. Backs of hands and feet white. Tail finely haired, dull brown above, white below; bristle-hairs numerous, whitish in colour.

Skull very small and with the brain-case markedly flattened, much more so than in any of the *bicolor* group; maxillary region rather narrow. Teeth very small, third upper unicuspid a little broader than second.

Dimensions of the type (from dried skin):—

Head and body 40 mm.; tail 30; hind foot 8.5.

Skull of specimen from Eyk, Somaliland (the type-skull is too badly broken to be of any use for measuring purposes):—

Condyllo-incisive length 16; greatest breadth 7; least interorbital breadth 3.2; length of palate 6.7; postpalatal length 7.4; greatest maxillary breadth 4.6; median depth of brain-case 3.2; length of upper tooth-row 6.8.

Hab. Dollo, Somaliland.

Type. Adult. B.M. no. 90. 3. 6. 1.

In the Collection there are two further specimens of this minute Somali shrew, both exactly like the type in general colour and dimensions.

The small size, greyish-brown upper parts, whitish belly, and very small flat skull readily distinguish *nana* from all the preceding species.

(112) *Crocidura nanilla*, Thos.

Crocidura nanilla, Thomas, Ann. & Mag. Nat. Hist. (8) vol. iv. p. 99 (1909).

Smaller and greyer than *nana*.

Fur shorter, hairs of back only 2–3 mm. in length. Colour of dorsal surface slate-grey (rather paler than "*Chætura* drab"); transition from slate-coloured flanks to whitish underparts well defined; belly rather greyer than in *nana*. Backs of hands and feet white. Tail finely haired, slaty brown above, white below; bristle-hairs numerous, grey in colour.

Skull smaller and with shorter brain-case than in *nana*, equally flat. Teeth rather smaller, second and third upper unicuspid about equal in size.

Dimensions of the type (taken from spirit-specimen):—

Head and body 41 mm.; tail 31; hind foot 8·2; ear 6·3.

Skull: condylo-incisive length 15·1; greatest breadth 6·8; least interorbital breadth 3; length of palate 6·1; post-palatal length 7; greatest maxillary breadth 46; median depth of brain-case 3·2; length of upper tooth-row 6·5.

Hab. Uganda (probably Entebbe).

Type. Adult female (skinned from spirit). B.M. no. 9.7.14.1.

This Uganda pygmy shrew is distinguished from the Somali *nana* by its smaller skull and more slaty colouring.

(113) *Crocidura pasha*, sp. n.

A very small cinnamon-coloured species, with a smaller skull than either *nana* or *nanilla*.

Size of head and body measured as rather larger than in *nana*; hind foot 9 mm. in length. Fur quite short, hairs of back only about 2·5 mm. in length.

Colour of upper parts pale cinnamon mottled with grey, the resulting effect between "wood-brown" and "drab," much browner and less slate-coloured than in *nana* or *nanilla*, more as in the larger *whitakeri* from Marocco. Flanks as brightly coloured as back, sharply contrasting with the pure white belly; hairs of belly almost uniformly white, only the extreme bases being greyish, the general effect much whiter than in *nana* or *nanilla*. Backs of hands and feet whitish buff. Tail finely haired, cinnamon-brown

above, whitish below ; bristle-hairs long and numerous, white in colour.

Skull smaller than in *nanilla*, of the same exceptionally flattened type, sides of brain-case rather less parallel, more convex. Teeth smaller, second upper unicuspid a trifle smaller in horizontal section than the third, which slightly overlaps it.

Dimensions of the type (measured in the flesh) :—

Head and body 50 mm. ; tail 38 ; hind foot 9 ; ear 8.

Skull of type and of a female specimen from Khartoum :—
 Condylar-incisive length 14·4, 14·2 ; greatest breadth 6·6, 6·6 ;
 least interorbital breadth 3·1, 3 ; length of palate 5·7, 5·5 ;
 postpalatal length 6·7, 6·8 ; greatest maxillary breadth 4·3, 4 ;
 median depth of brain-case 2·9, 2·9 ; length of upper tooth-
 row 5·9, 5·9.

Hab. Atbara River, Sudan.

Type. Adult female. B.M. no. 8.9.22.1. Collected on July 10th, 1908, by W. G. Percival, Esq., and presented by him to the British Museum.

In the Collection there are two specimens, preserved in spirit, from Khartoum which undoubtedly represent this species ; the skull-dimensions of one of these individuals are given above.

The pale cinnamon-coloured dorsal surface, sharply contrasting with the almost pure white of the underparts, and smaller skull and teeth distinguish this handsome little shrew from *nana*, *nanilla*, and *religiosa*.

(114) *Crocidura glebula*, sp. n.

Closely allied to *pasha*, but rather darker in colour.

Size about as in *pasha* ; fur equally short.

Colour of dorsal surface considerably darker and duller, between "hair-brown" and "snuff-brown," speckled with "neutral grey" ; flanks a little greyer, the brownish tint passing fairly abruptly into the greyish white of the ventral surface, but not nearly so sharply contrasted as in *pasha*. Underparts greyish white, basal halves of hairs slate-grey, apical portions whitish, the general effect much duller and greyer than in the Sudan species. Backs of hands and feet white. Tail finely haired, light drab-brown above, white below ; bristle-hairs slender and inconspicuous, but fairly numerous.

Skull missing.

Dimensions of the type (measured in the flesh) :—

Head and body 56 mm. ; tail 32 ; hind foot 9 ; ear 8.

Hab. Zungeru, Northern Nigeria.

Type. Female. B.M. no. 4.7.9.14. Original number 16.

Collected and presented to the British Museum by Capt. H. Cock, R.A.

In spite of the absence of the skull, there can be little doubt regarding the affinities of this shrew. The darker and duller-coloured upper parts and distinctly greyer belly distinguish it at once from *pasha*. The only other West-African species at all similar in general colour is *cinderella*, from the French Gambia, which may be easily distinguished by its larger size, longer tail, and much longer fur.

(115) *Crocidura religiosa*, Is. Geoff.

Sorex religiosus, Is. Geoffroy, Mém. Mus. xv. p. 128 (1827).

In size about as in *nana*, but greyer in colour.

Fur shorter than in *nana*, about like that of *nanilla*.

Colour of upper parts dull drab-grey faintly washed with brownish, the general effect much as in "hair-brown," considerably greyer than in *nana*, but not so slaty as in *nanilla*. Flanks rather paler, the tint gradually fading and passing imperceptibly into the light grey of the underparts ; hairs of belly with grey bases and greyish-white tips, on chin and throat rather lighter. Backs of hands and feet white. Tail drab-colour above, whitish below ; bristle-hairs numerous, greyish in colour.

Skull about equal in length to that of *nana*, quite as flat, the brain-case a trifle broader. Teeth similar.

Dimensions (taken from spirit-specimens) :—

	Head and body. mm.	Tail. mm.	Hind foot. mm.
Giza	45	36	9
"	49	40	9·5
Cairo	52	37	9·2
"	47	34	8·5
"	50	34	9
"	47	34	8·7

Skulls of two adults: condylo-incisive length 15·8, 15·8 ; greatest breadth 7, 7 ; least interorbital breadth 3·2, 3·1 ; length of palate 6·2, 6·2 ; postpalatal length 7·4, 7·4 ; greatest maxillary breadth 4·9, 4·7 ; median depth of brain-case 3, 3 ; length of upper tooth-row 6·8, 6·8.

Hab. Egypt.

This Egyptian shrew is distinguished from *nana* by its shorter fur, rather duller and greyer dorsal surface, and much greyer underparts. The Sudan species, *pasha*, is separated from *religiosa* by its much smaller skull, brighter colouring, and white ventral surface. The smaller size and more slaty colour at once distinguish *nanilla* from this species.

(116) *Crocidura lusitania*, sp. n.

Allied to *nana*, larger in size and with larger skull and teeth.

Body and hind foot larger than in *nana*; tail rather longer. Fur very short, hairs of back about 2.5 mm. in length.

Colour (taken from spirit-specimens) of dorsal surface rather darker than in *glebula*, dull greyish cinnamon-brown, changing fairly abruptly on the flanks into the greyish white of the underparts. Chin and throat, backs of hands and feet, and lateral gland white. Tail long; light brown above, whitish below; bristle-hairs numerous and long, distributed over nearly the whole length of the tail, white in colour.

Skull of the same flattened shape as in *nana*, brain-case broader, muzzle less slender. Teeth larger and heavier; third upper unicuspid rather broader than second, but not markedly so.

Dimensions of the type and topotype (spirit-specimens):—

Head and body 53, 53 mm.; tail 43, 42; hind foot 10.6, 10.5; ear 8, 7.

Skulls: condylo-incisive length 16.9, 17; greatest breadth 7.5, 7.4; least interorbital breadth 3.6, 3.2; length of palate 7, 7; postpalatal length 7.8, 8; greatest maxillary breadth 5.2, 5; median depth of brain-case 3.7, 3.6; length of upper tooth-row 7.2, 7.4.

Hab. Trarza Country, Mauritania.

Type. Adult male. B.M. no. 13. 3. 7. 2. Collected by M. Audan.

The larger size distinguishes this species from all the other members of the *nana* group.

The Nigerian *glebula* would appear to be its nearest relation; it is probably also related to the Gambian *cinderella*, which species possesses a larger and less flattened skull and more incrassated tail.

Group 22 (*dolichura*).

Size medium or very small. Colour above dark brownish red, greyish, or blackish. Caudal bristle-hairs almost entirely absent.

(117) *Crocidura dolichura*, Pet.

Crocidura dolichura, Peters, MB. Akad. Berlin, p. 475 (1876).

A fairly small species with very long tail, caudal bristle-hairs almost entirely absent.

Size of body small; tail exceptionally long, about 80 mm. in length.

Colour slate-grey above, gradually fading on the flanks to the greyish tint of the belly, which is only a shade lighter than on the back. Backs of hands and feet dirty white or brownish; claws of fore and hind feet about equal. Tail very long, cylindrical, and appearing almost naked, but covered with very short brown hairs, rather darker above than below; caudal bristles almost absent, a few situated at the extreme root of the tail.

Dimensions of the type (as given by Peters):—

Head and body 63 mm.; tail 80; hind foot 14 (c. u.); ear 9.

Skull: length of upper tooth-row 7·9.

Hab. Bonjongo, Cameroons.

In the Museum Collection there are two spirit-specimens from the Cameroons which may be referred to this species; the following are the flesh-dimensions of these specimens:—Head and body 59, 60 mm.; tail 84, 78; hind foot 13, 13·2 (s. u.); ear 8, 8.

The skull of one specimen having been taken out, it is possible to give the following dimensions:—

Condylar-incisive length 20; greatest breadth 8·6; least interorbital breadth 4·2; length of palate 7·8; postpalatal length 9·2; greatest width across maxillary region 5·7; median depth of brain-case 5 1; length of upper tooth-row 8·6.

The skull is smaller than that of the following species; brain-case narrow and high, muzzle not tapering so suddenly. Teeth small, second and third upper unicuspid about equal in size and roughly circular in section, much broader than those of *maurisca*; cingula exceptionally prominent.

Externally this shrew may be at once recognised by its extremely long and apparently hairless tail. The great length of the tail readily separates it from the other members of this group.

(118) *Crocidura maurisca*, Thos.

Crocidura maurisca, Thomas, Ann. & Mag. Nat. Hist. (7) vol. xiv. p. 239 (1904).

A medium-sized species, chocolate-brown in colour, possessing the cylindrical hairless tail so characteristic of this group; skull small and tapering, unicuspid very narrow.

General body-proportions much as in *dolichura*, tail markedly shorter.

Colour above dull chocolate-brown, flanks slightly lighter, the brown tint gradually passing into the brownish of the ventral surface, which is slightly paler than the upper parts. Backs of hands and feet same colour as back; the fore and hind claws subequal. Tail slender and cylindrical, long hairs present only at the extreme base; brownish above and below.

Skull small and narrow in front, tapering anteriorly more markedly than in any other member of this group; brain-case fairly broad and high, maxillary region narrow, muzzle slender and tapering to a sharp point. Teeth small, upper incisors very narrow, small unicuspid longer than broad, oval in section, third slightly longer than second; cingula prominent.

Dimensions of the type (taken from spirit-specimen before skinning):—

Head and body 75 mm.; tail 60; hind foot 14·4; ear 10.

Skull: condylo-incisive length 20·7; greatest breadth 9·2; least interorbital breadth 4·3; length of palate 8·3; post-palatal length 9·2; greatest width across maxillary region 6·2; median depth of brain-case 5·4; length of upper tooth-row 9·1.

Hab. Entebbe, Uganda.

Type. Adult female. B.M. no. 1.8.9.99.

This species is known only from the type-specimen, and, as this was for a short period preserved in spirit, it is impossible to accept the general coloration of this individual as strictly normal. There can be no doubt, however, that it is a very dark-coloured species, both above and below.

The narrow tapering muzzle of the skull and small very narrow unicuspid serve to separate *maurisca* from all the other members of this naked-tail group.

(119) *Crocidura niobe*, Thos.

Crocidura niobe, Thomas, Ann. & Mag. Nat. Hist. (7) vol. xviii. p. 138 (1906).

Slightly smaller than *maurisca*; agrees in the almost entire absence of long bristles on the tail, but considerably greyer in colour, and possesses a shorter stouter skull with broader unicuspid.

Size of body and hind feet rather less than in the *Entebbe* species.

General colour dark slaty grey (varies from "blackish brown (2)" to "blackish brown (2)" mixed with "clove-brown"), indistinctly mottled with silvery grey. Underparts slate-grey, rather lighter than in *maurisca*, only the extreme tips of the hairs tinted with light brown. Backs of hands and feet slate-brown, fore claws rather smaller than hind. Tail long, slender, and cylindrical, long hairs present only on the basal portion; uniformly blackish brown above and below.

Skull less delicately built than that of *maurisca*, stouter and slightly flatter; muzzle blunter and less tapering, maxillary region rather broader. Teeth rather smaller, unicuspid broader, nearly circular in section, second rather smaller than and overlapped by third; cingula well developed. The broad almost circular second and third unicuspid are very different from the narrow oval-shaped teeth of *maurisca*. Cheek-teeth square-shaped.

Dimensions of the type (measured in the flesh):—

Head and body 61 mm.; tail 63; hind foot 13; ear 10.

Skull: condylo-incisive length 20; greatest breadth 9.1; least interorbital breadth 4.5; length of palate 7.8; post-palatal length 9; greatest maxillary breadth 6.3; depth of brain-case 5.4; length of upper tooth-row 8.2.

Hab. Ruwenzori East. Altitude 6000 feet.

Type. Adult female. B.M. no. 6.7.1.32.

There are three specimens of this shrew in the collection, all from Ruwenzori, collected at altitudes between 6000 and 7000 feet.

The much broader and less tapering skull and broader unicuspid distinguish this species from *maurisca*.

(120) *Crocidura bottegi*, Thos.

Crocidura bottegi, Thomas, Ann. Mus. St. Nat. Genova, (2) vol. xviii. (xxxviii.) p. 677 (1898).

Much smaller than *niobe*, but possessing the same domed-shaped skull and bristleless tail.

In general dimensions more as in the *nana* group, body very small. Fur long, hairs on back from 5 to 6 mm. in length.

Colour (from spirit-specimen) dark brown above and below, the belly scarcely paler. Hands and feet equally dark. Tail long and slender, finely haired, dark brown above, a shade paler below; bristle-hairs almost entirely absent, a few very short ones near the base.

Skull in general build like that of *niobe*, but very much smaller; brain-case very high and rounded, the junction of the lambdoidal and sagittal sutures situated fairly far forward, as in *niobe* and the flatter skull of *fumosa*. Interorbital region very broad behind, narrowing in front rather abruptly. Maxillary region narrow. Teeth small, anterior upper incisors directed forwards in such a manner that they do not project downwards below the level of the second incisors; second and third upper unicuspid small, third a little broader than second. Cheek-teeth of the same square shape as in *niobe*, the last upper molar exhibiting the same characteristic form, the main grinding-area square-shaped, abruptly narrowing externally into a small lateral point. In length this skull is more as is found in the *nana* group, but its build is so different from the exceedingly flat skulls of *nana* and its allies that it is impossible to consider it in any way closely related.

Dimensions of co-type (in spirit):—

Head and body 44 mm.; tail 41; hind foot 10·7; ear 7·3.

Skull: condylo-incisive length 15·3; greatest breadth 7·3; least interorbital breadth 3·4; greatest posterior interorbital breadth 4·2; length of palate 6; postpalatal length 7; greatest maxillary breadth 4·3; depth of brain-case 4·4; length of upper tooth-row 6·3.

Hab. Between Badditu and Dimè, near Lake Margharita, N.E. of Lake Rudolf.

The co-type in the British Museum (B.M. no. 98. 2. 5. 6) is an adult male.

The minute size of this species immediately distinguishes it from all the other members of this group. The only points which it has in common with *nana* and its allies are the small size of the body and skull; the high brain-case, square-shaped cheek-teeth, great posterior breadth of the interorbital region, and almost entire absence of caudal bristles show beyond doubt that it is most nearly related to *niobe*.

(121) *Crocidura monax*, Thos.

Crocidura monax, Thomas, Ann. & Mag. Nat. Hist. (8) vol. vi. p. 310 (1910).

Larger than *maurisca* with very much heavier and stouter skull.

Size medium, hind foot between 15·5 and 17 mm. in length.

General colour dark slaty, like that of *niobe*, but rather darker and without the mottled appearance (between "fuscous" and "fuscous black"). Flanks rather paler than back, the colour gradually passing into that of the ventral surface, which is a shade greyer and paler than the upper parts. Backs of hands and feet brownish, fore and hind claws about equal in size. Tail slender and cylindrical, long caudal bristles almost entirely absent, a few only at the base; colour blackish brown above and below.

Skull considerably larger than that of *maurisca*, brain-case rather flat; maxillary region narrow, muzzle blunt. Teeth large, unicuspid with well-formed cingula, broad and roughly circular in section, very different from the narrow oval-shaped teeth of *maurisca*; third unicuspid slightly larger than and overlapping second.

Dimensions of the type (measured in the flesh):—

Head and body 88 mm.; tail 66; hind foot 16·2; ear 10.

Skull: condylo-incisive length 24·1; greatest breadth 10·7; least interorbital breadth 5·3; length of palate 9·7; postpalatal length 10·8; greatest maxillary width 7·5; median depth of brain-case 6·1; length of upper tooth-row 11.

Hab. Rombo, Kilimanjaro. Altitude 5000 feet.

Type. Old female. B.M. no. 10. 7. 2. 58.

In addition to the type there are in the Museum Collection seven further specimens from Rombo, all remarkably uniform in general colour. The following are the collector's measurements of six of these specimens:—

	Head and body.	Tail.	Hind foot.
	mm.	mm.	mm.
♂. Rombo	87	62	16·2
♂. "	88	61	15·5
♂. "	91	65	17
♀. "	81	62	16
♀. "	88	62	16·5
♀. "	83	64	15·5

In general colour this species is slightly darker than

niobe ; it may be distinguished at once by its larger size and very much larger and stouter skull.

(122) *Crocidura littoralis*, Hell.

Crocidura littoralis, Heller, Smith. Misc. Coll. vol. lv. no. 15, p. 5 (1910).

Allied to *monax*, darker and browner in colour.

Size of body and hind foot rather larger than in the Kilimanjaro species.

Colour of dorsal surface rich sepia, considerably browner than the dark slaty pelage of *monax* ; underparts vandyke-brown, the chin and throat suffused with grey. Hair everywhere plumbeous at base. Backs of hands and feet rather lighter than back. Tail as in *monax*.

Skull about equal to that of *monax*, rather narrower and with a slightly shorter tooth-row.

Dimensions of the type (measured in the flesh, excepting the hind foot) :—

Head and body 96 mm. ; tail 67 ; hind foot 17.

Skull : condylo-incisive length 24 ; greatest breadth 10 ; length of upper tooth-row 10.

Hab. Butiaba, east shore of Albert Nyanza, Uganda.

Type. Adult male. U.S. Nat. Mus. no. 164642.

This species is evidently very closely allied to *monax*, from which it may be distinguished by its browner and darker colour.

(123) *Crocidura ultima*, sp. n.

Allied to *monax*, distinguished by its paler and browner colour and the large size of third upper unicuspid, as compared with the second.

Size of body much as in *monax*.

General colour reddish brown mottled with grey, effect very much as in "clove-brown" sprinkled with greyish buff, very different from the dark blackish-brown coloration of *monax*. Underparts rather greyer than upper, not distinctly differentiated from the brownish tint of the flanks. Backs of hands and feet pale brownish buff ; claws of hind feet slightly larger than those of fore feet. Tail fairly long, covered with very short brownish hairs, the general effect as in *monax* ; colour reddish brown above and below, paler than in the other members of this group ; caudal bristles almost entirely absent, a few near the base on the ventral surface.

Skull slightly smaller than that of *monax*, of a very similar

build, broad with blunt muzzle. Teeth slightly smaller; second unicuspid conspicuously smaller than and overlapped by third, circular in section with well-developed cingula.

Dimensions of the type (measured in the flesh):—

Head and body 90 mm.; tail 62; hind foot 16; ear 13.

Skull: condylo-incisive length 22·9; greatest breadth 10·2; least interorbital breadth 5·3; length of palate 9·3; postpalatal length 10; greatest maxillary breadth 6·8; length of upper tooth-row 10·2.

Hab. Jombeni Range, Nyeri District, British East Africa. Altitude 5000 feet.

Type. Adult. B.M. no. 12. 7. 1. 60. Original number 868. Collected and presented by A. Blayney Percival, Esq.

This Jombeni form may be distinguished at once from *monax* by the great difference in size between the second and third upper unicuspid, the third being very much larger and considerably overlapping the second, while in *monax* the third unicuspid is only slightly larger than the second.

(124) *Crocidura neavei*, Wrought.

Crocidura neavei, Wroughton, Manchester Memoirs, vol. li. no. 5, p. 7 (1907).

In size rather larger than *maurisca*, but much blacker in colour and possessing a flatter skull with rather broader teeth.

Size of body and hind foot a little larger than in *maurisca*.

General colour very dark seal-brown (dark "fuscous black" finely speckled with "cinnamon-brown"), fading gradually on the flanks into the brownish grey of the ventral surface. Backs of hands and feet brownish; fore claws rather smaller than hind. Tail long and clothed with short blackish hairs above and below, general appearance as naked as in the foregoing species; long caudal bristles only present on the basal portion.

Skull about equal in size to that of *maurisca*, with flatter brain-case; maxillary region more expanded, muzzle not tapering so markedly. Tooth-row equal in size to that of *maurisca*, second and third upper unicuspid rather broader, but not so broad as in *dolichura*; cingula well developed.

Dimensions of the type (measured in the flesh):—

Head and body 78 mm.; tail 60; hind foot 16; ear 9.

Skull: condylo-incisive length 20·7; greatest breadth 8·8; least interorbital breadth 4·7; length of palate 8·2;

postpalatal length 9·5; greatest maxillary breadth 6·4; median depth of brain-case 4·9; length of upper tooth-row 9·1.

Hab. Kafue River, Northern Rhodesia. Altitude 4000 feet.

Type. Adult female. B.M. no. 7. 1. 11. 12.

Since this species was described Mr. Neave has collected a second specimen of this interesting shrew on the Kalungwisi River, east of Lake Mweru. It agrees very closely with the type in the general colour and the caudal characters described above.

The very dark blackish colour readily separates this form from all the more northern species; it would seem to be more nearly allied to the following species than to any of the other members of this group.

(125) *Crocidura sylvia*, Thos. & Schw.

Crocidura sylvia, Thomas & Schwann, P. Z. S. xxxix. p. 587 (1906).

A very dark-coloured species with rather more long hairs on the basal portion of the tail than in the other members of this group.

Size of body and hind foot as in *maurisca*; tail usually rather shorter.

General colour dark seal-brown ("fuscous black" and "black" sprinkled with golden buff), as dark as in *neavei*; underparts slightly paler. Backs of hands and feet brownish; claws of fore and hind feet about equal in size. Tail shorter than in *neavei* or *maurisca* and more hairy, the entire tail covered with fairly conspicuous black hairs, not, as in the other members of this group, appearing almost naked; caudal bristles very slender, but fairly numerous on the basal portion of the tail, more conspicuous than in any of the allied species. As regards the length of the tail it will be seen from the figures given below that, while the usual length is between 53 and 60 mm., there is one rather larger specimen from Inhambane in which the tail is fully 67 mm. in length; it is interesting to note that in this individual the tail is less hairy than in the Zoutpansberg series and the caudal bristles less numerous—the general effect much more that of *neavei*.

Skull rather longer than that of *maurisca*, with broader muzzle, the nasal region about as in *neavei*; brain-case proportionally narrower and rather high, the general shape

of the skull rather like a larger edition of *dolichura*. Maxillary breadth as great as in *neavei*. Teeth larger and broader than in *maurisca*, unicuspid, roughly circular in shape, slightly broader than those of *neavei*; cingula fairly prominent.

Dimensions of the type (measured in the flesh) :—

Head and body 81 mm. ; tail 53 ; hind foot 15 ; ear 8·5.

The following are the skin-dimensions of the other specimens of *sylvia* in the collection :—

	Head and body.	Tail.	Hind foot.	Ear.
	mm.	mm.	mm.	mm.
♀. Zoutpansberg....	84	50	14·5	8
♀. "	78	51	14·7	8
♂. "	76	49	14	8
♂. "	74	54	14·7	8
♂. "	82	50	15	9
♂. "	81	60	17	8
♂. "	78	54	15	8
♀. Zululand.....	91	58	14	6
♂. Inhambane.....	90	67	16	9

Skull-dimensions of the type and two other specimens from the type-locality :—

	♂ (type).	♂.	♂.
	mm.	mm.	mm.
Condylo-incisive length.....	21·5	22	21·3
Greatest breadth.....	9·1	9·2	9·2
Least interorbital breadth.....	4·3	4·5	4·6
Length of palate.....	8·6	9	8·7
Postpalatal length.....	9·9	9·9	9·5
Greatest maxillary breadth.....	6·7	6·7	6·3
Length of upper tooth-row.....	9·1	9·4	9·2

Hab. Woodbush, Zoutpansberg District, N.E. Transvaal. Altitude 4500 feet.

Type. Adult male. B.M. no. 6. 4. 3. 10.

This species may be distinguished from the other members of this group by its more hairy and rather shorter tail; its very dark colour separates it from all the equatorial forms, *neavei* from the Kafue River being the only species as dark as *sylvia*.

The following forms I have been unable to determine :—

(a) *Crocidura ferruginea*, Heug.

Crocidura ferruginea, Heuglin, Nov. Act. Ac. Cæs. Leop.-Carol. part i. p. 36 (1865).

Length of head and body 5'' 3''' ; tail 2½''.

Hab. "Lande der Ridj-Neger," Bahr-el-Ghazal.

The description is extremely vague, the author not being quite certain as to whether there are three or more upper unicuspid. If the specimen was really a *Crocidura* it is possible that *ferruginea* is a member of the *nyansæ* or *doriana* groups.

(b) *Crocidura fusco-murina*, Heug.

Sorex fusco-murinus, Heuglin, Nov. Act. Ac. Cæs. Leop.-Carol. part i. p. 36 (1865).

Smaller than *sericea*, but not as small as in the *nana* group; length of head and body 2'' 2''' ; tail 1'' 9½'''.

"Supra nitide fusco-murinus, subtus pallidior, magis cinerascens; mento labisque obsolete albis; auriculis majusculis, latis, rotundatis . . ."

Hab. Meshra el Req, Bahr-el-Ghazal.

This species is probably allied to *butleri*, from which it is easily distinguished by its general dimensions.

(c) *Crocidura viarius*, Is. Geoff.

Sorex viarius, Is. Geoffroy, Voy. Bél., Zool. p. 127 (1834).

A small species; the only Senegalese shrew of similar size in the Museum Collection is a *Pachyura*.

"Pelage d'un roux grisâtre en dessus, d'un cendré clair en dessous. Oreilles grandes, non cachées dans les poils. Queue un peu comprimée dans sa première portion, arrondie vers son extrémité, garnie de longues soies clair-semées, dirigées en arrière. Longueur du corps et de la tête, un peu plus de 3 pouces; longueur de la queue, 2 pouces."

Hab. Senegal.

(d) *Crocidura infumata*, Wag.

Sorex infumatus, Wagner, Schreb. Säug. Suppl. ii. p. 76 (1841).

From the dimensions and colour it seems most probable that *infumata* is related to the *hirta* group, possibly to *flavidula* or *pondoensis*.

Length of head and body 3'' 1''' ; tail 1'' 9½'''.

Hab. Cape.

(e) *Crocidura fulvaster*, Sund.

Sorex fulvaster, Sundevall, Vet. Akad. Handl. Stock. pp. 172 & 178 (1842).

This form is described as "palide griseo-fulvescens, subtus cinereo-albus, dentibus intermediis supra 3; secundo tertioque æqualibus."

Dimensions of the type (as given by Sundevall) :—

Head and body 90 mm. ; tail 44 ; hind foot (c. u.) 13.

Hab. Bahr el Abiad.

It seems probable that *fulvaster* is only a colour-phase of Sundevall's *sericea* ; if this should be the case, the name *fulvaster* must stand owing to page priority, *sericea* and *strauchii* then being placed as synonyms of *fulvaster*.

(f) *Crocidura macrodon*, Dobs.

Crocidura macrodon, Dobson, Ann. & Mag. Nat. Hist. (6) vol. v. p. 226 (1890).

A medium-sized species.

Colour not described.

Skull with long anterior incisors, third upper unicuspid broader than second.

Dimensions of the type (as given by Dobson) :—

Head and body 68 mm. ; tail 46 ; hind foot 14 ; ear 8.5.

Skull : "distance of the tip of first incisor from apex of principal cusp of the last premolar $5\frac{1}{2}$."

Hab. "Sudan?"

Type (in spirit). No. 1968. Zoological Museum, Petrograd.

It is probable that this shrew is allied to the *fumosa* group, but from the description alone it is impossible to arrive at any true idea of the affinities of the species.

BIBLIOGRAPHICAL NOTICE.

Manual of the New Zealand Mollusca. Atlas of Plates. By H. SUTER. Published by the Authority of the Government of New Zealand. 72 Plates, with Explanations.

WHEN reviewing the text of this work in our number for July 1914 we expressed the hope that the plates, when they arrived, would prove superior to the text in "get up."

This we are now glad to be able to state is the case. Not that the whole of the seventy-two plates composing this Atlas are of equal merit—some are decidedly poor, and the figures based on photographs leave much to be desired. On the other hand, the reproductions of the author's own careful drawings of the Endodonts are excellent. In all cases, however—and this is the important point,—the species delineated are clearly recognizable, which, alas ! is often not the case in some quite beautifully executed plates where artistic licence has been taken with the subjects.